

REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks.

Claims 1, 3-5, 7-9, 11-14, 16, 17, 20-33, 35, 68-71 and 73-80 are pending in the application, with claims 1, 31, 68 and 74 being independent claims. Claims 1, 3, 4, 21-25, 31, 32, 68, 70, 74 and 75 are amended herein. Support for the amendments can be found in the original disclosure. No new matter has been added.

§112 FIRST PARAGRAPH REJECTIONS

Claims 76-80 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement as they are alleged to introduce new matter. This rejection is respectfully traversed.

With regard to claim 76, the specification on page 8 lines 8-16 states:

“Generally, every node in the DOM tree for a document can represent a visual block. Some large nodes (e.g., having <TABLE> or <P> tags) are typically used only for organization purpose and are not appropriate to represent a single visual block. Thus, such large nodes are further divided and replaced by their children nodes. On the other hand, because of the potentially large number of leaf nodes, the visual blocks should not be initially identified as being every leaf node in the DOM tree (although, due to the top-down nature of the vision-based document segmentation, some of these leaf nodes may eventually be identified as visual blocks).”

Thus, the visual blocks are identified, i.e., specified, with respect to the

document model, i.e., the DOM. Thus, what the examiner identifies as the “first limitation in claim 76 (Office Action page 3 under heading 9) has support in the originally filed specification and does not introduce new matter.

With regard to what the examiner identifies as the “second limitation” in claim 76 (Office Action page 3 under heading 9) as well as claims 77 and 78, the specification on page 21 lines 6-12 also states:

A separator is represented by a 2-tuple (P_s , P_e), where P_s is the start pixel of the separator and P_e is the end pixel of the separator. Each pixel P_s and P_e is identified as an X,Y-coordinate pair, and a rectangular region can be defined by setting the P_s and P_e pixels as opposite corners of the region (e.g., lower left and upper right corners, upper left and lower right corners, etc.). The width of the separator is calculated as the difference (e.g., in the X direction) between P_s and P_e .

Thus, the separators are specified using a 2-tuple with respect to the document as it would be displayed, i.e., a display region or display area defined by an XY coordinate pair. The 2-tuple (P_s , P_e), includes P_s , the start pixel of the separator, and P_e , the end pixel of the separator. Thus, claims 76-78 have support in the originally filed specification and do not introduce new matter.

With regard to claims 79 and 80, the specification on page 21 line 21 to page 22 line 2 states:

Initially, a separator list is initialized with one separator (act 202). This one separator includes all regions of the display area for the document that may potentially be a separator(s). In certain embodiments, this initial separator includes the entire area of the document, or alternatively this initial separator may be a single rectangular region that includes all of the blocks in the pool of visual blocks identified by the visual block identification.

Thus, the initial separator is described as including the entire area of the document, or alternatively a single rectangular region that includes all of the blocks in the pool of visual blocks identified by the visual block identification. For at least this reason, claims 79 and 80 have support in the originally filed specification and do not introduce new matter.

§112 SECOND PARAGRAPH REJECTIONS

Claims 68-71 and 73-75 stand rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. Claims 68 and 74 have been suitably amended to overcome the Examiners rejection of these claims and are believed to be in condition for allowance. Further, in view of these amendments to the independent claims, dependent claims 69-71 and 73-74 are also assumed to have overcome Examiners rejection of these claims and hence are believed to be in condition for allowance.

§103 REJECTIONS

Claims 1, 3-5, 7-9, 11-14, 16, 17, 20-33, 35, 68-71 and 73-80 stand rejected under 35 U.S.C. § 103(a) as being obvious over Yang et al. "*HTML Page Analysis Based on Visual Cues*" from the 6th International Conference on Document Analysis and Recognition (ICDAR 2001), Seattle, Washington,

USA, Copyright 2001 (“Yang”) in view of US Patent Publication 2004/0013302, to Ma et al. (“Ma”). Applicant respectfully traverses the rejection.

Independent claim 1, as presently amended, recites:

A method implemented at least in part by a computing device of identifying one or more portions of a document described by a tree structure having a plurality of nodes, the method comprising:

identifying a plurality of visual blocks in the document based on, at least, a document model of the document;

detecting, distinct from the plurality of visual blocks, one or more separators of the document based on, at least, one or more characteristics of at least one of the plurality of visual blocks;

assigning, to each of the one or more separators, a weight based on characteristics of visual blocks on either side of the separator; and

constructing, based at least in part on the plurality of visual blocks and the one or more separators, a content structure for the document, wherein the content structure identifies the different visual blocks as different portions of semantic content of the document.

Yang is directed towards a method to automatically analyzing semantic structure of HTML pages based on detecting visual similarities of content objects on web pages (Yang, Abstract). The method employs measuring visual similarities of HTML content objects and then applying a pattern detection algorithm to detect frequent pattern of visual similarity (Yang, Abstract). Grouping items according to these patterns builds a hierarchical representation (tree) of HTML document with visual consistency inferred semantics (Yang, Abstract). However, Yang does not teach or suggest the subject matter of claim 1.

For example, Yang does not describe “a document described by a tree structure having a plurality of nodes”. Yang merely refers to an HTML document but fails to suggest that it is described by a tree structure having a plurality of nodes.

Yang also does not disclose “detecting, distinct from the plurality of visual blocks, one or more separators of the document based on, at least, one or more characteristics of at least one of the plurality of visual blocks wherein the separator is an indicator for discriminating different semantics within the document”. Rather, Yang describes that in typical web pages it is common to divide contents into categories where each category holds records of related subtitles (Yang, Page 2, left column). Yang suggests merely detecting these already present visual cues in a web page and then detecting records and categories (Yang, Page 2, left column). Yang fails to teach or suggest “detecting, distinct from the plurality of visual blocks, one or more separators of the document.” wherein “the separator is an indicator for discriminating different semantics within the document” as recited in claim 1.

Further, Yang does not teach or suggest “assigning, to each of the one or more separators, *a weight* based on characteristics of visual blocks on either side of the separator”. In fact, Yang makes no mention of weight assignment to separators at all.

Yang also does not teach or suggest “constructing, based at least in part on the plurality of visual blocks and the one or more separators, a content structure

for the document, wherein the content structure identifies the different visual blocks as different portions of semantic content of the document.” Yang describes that structured documents are constructed in a recursive manner (Yang, page 4 right column, section 3.4). Starting from simple objects and group objects, these elements are divided into initial container objects roughly based on block level tags (Yang, page 4 right column, section 3.4). Then the pattern detection algorithm is applied to elements of these initial container objects, and detected patterns are converted to list objects (Yang, page 4 right column, section 3.4). Yang fails to disclose “constructing a content structure of the document based on visual blocks and separators and also does not disclose that the content structure identifies different visual blocks as portions of semantic content of the document” as recited in claim 1.

Further, Yang fails to teach or suggest “identifying a plurality of visual blocks in the document based on, at least, a document model of the document”. The Office, on page 6 of the Office Action, admits that Yang fails to disclose this feature, which is described as “identifying based on a document model of the document.” Applicant agrees. Ma was therefore cited by the Office for its alleged teaching of “the use of a document model to identify blocks of a document.” However, Ma fails to remedy the foregoing deficiencies in Yang noted above with respect to claim 1.

Ma is directed to a “document identification system for identifying a segmented document” (Ma, Para [0009]). The system has a database of layout

graph models (Ma, Para [0009]). A matching module determines a match between a sample layout graph from the segmented document and a particular layout graph model from the database (Ma, Para [0009]). A classified and/or labeled, segmented document is thus generated, with document class and logical labels associated with each segment (Ma, Para [0009]). After verification of correct identification, results are fed into a model-training process which learns or improves the document model for that class stored in model data store (Ma, Para [0021]). The document model as described by Ma is specifically directed toward layout graphs in a segmented document. However, the “document model” and method identification of Ma does not include “identifying a plurality of visual blocks in the document based on, at least, a document model of the document” as recited in claim 1. Moreover, Ma fails to teach or suggest “assigning, to each of the one or more separators, *a weight* based on characteristics of visual blocks on either side of the separator” as recited in claim 1. For at least these reasons, Ma fails to remedy the noted deficiencies in Yang.

Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined) fail to disclose or suggest the features of claim 1. Accordingly, claim 1 is allowable.

Dependent claim 3 depends from independent base claim 1 and therefore includes all of the elements of the allowable base claim. Aside from being allowable by the virtue of its dependence on allowable base claim, claim 3 is also

allowable because neither Yang nor Ma either alone or in combination disclose or suggest all the features recited claim 3.

As discussed in reference to independent claim 1, Yang fails to disclose a document described by a tree structure having a plurality of nodes. Further, Yang also fails to disclose “identifying a group of candidate nodes of the plurality of nodes; for the respective nodes in the group of candidate nodes: determining whether the node can be divided, and if the node cannot be divided, then identifying the node as representing a visual block.”

Yang describes that to compare visual similarities of complex objects, the process starts from simple objects (Yang, Page 2, right column, last paragraph). During the process to parse HTML documents and to extract simple objects, text rendering parameters are extracted by keeping a stack of tags that affect text attributes like font face, styles, size, and color (Yang, Page 2, right column, last paragraph). Yang mentions parsing, which is a well-known process of analyzing a sequence of tokens to determine grammatical structure based on a fixed grammar. However, Yang fails to specifically teach or suggest “identifying a group of candidate nodes of the plurality of nodes” or that “for the respective nodes in the group of candidate nodes, determining whether the node can be divided, and if the node cannot be divided, then identifying the node as representing a visual block,” as recited in claim 3. Ma fails to remedy these deficiencies. As neither Yang nor Ma, taken either alone or in combination, disclose or suggest these features, claim 3 is allowable.

Dependent claim 4 depends from dependent claim 1 and therefore includes all the elements of the allowable base claim. Aside from being allowable by the virtue of its dependence on allowable base claim, claim 4 is also allowable because neither Yang nor Ma either alone or in combination disclose or suggest all the elements of claim 4.

Claim 4 has been amended to include as a feature that “setting a degree of coherence for the visual block represented by the node is “based on a plurality of rules.” Support for this amendment can be found in the original disclosure on pages 25 through 28.

Yang fails to disclose “if the node cannot be divided, then based on a plurality of rules, setting a degree of coherence for the visual block represented by the node” as presently claimed in claim 4. As discussed above with reference to claim 3, Yang fails to disclose “identifying a group of candidate nodes of the plurality of nodes” or that “for the respective nodes in the group of candidate nodes, determining whether the node can be divided, and if the node cannot be divided, then identifying the node as representing a visual block.” It thus follows that Yang also fails to teach or suggest setting a degree of coherence for the visual block based on a plurality of rules. Yang merely mentions a modifier which indicates whether two objects are comparable or not (Yang, Page 2, right column, last paragraph). Yang makes no mention of “setting a degree of coherence” that is “based on a plurality of rules.” Ma fails to remedy this deficiency. Therefore, Yang and Ma whether taken alone or in combination (assuming for the sake of

argument that they can be combined), fail to disclose or suggest the features of claim 4. Accordingly, claim 4 is believed to be allowable.

Dependent claims 5, 7-9, 11-13 depend from allowable base claim 1 and hence are allowable by the virtue of their dependence on the allowable base claim. Further claims 5, 7-9, 11-13 are also allowable because Yang and Ma either alone or in combination do not teach or suggest all the elements of these claims.

As mentioned above with respect to Claim 3, Yang fails to disclose “determining whether the node can be divided, and if the node cannot be divided, then identifying the node as representing a visual block.” It therefore follows that Yang fails to disclose that if “the node cannot be divided, then removing the node from the group of candidate nodes” as currently recited in claim 5. It also follows that Yang does not disclose that “determining whether the node can be divided comprises determining that the node can be divided if a background color of the node is different from a background color of a child of the node” as recited in claim 7. Ma fails to remedy these deficiencies.

Yang also fails to teach or suggest “determining whether the node can be divided comprises determining that the node can be divided if a size of the node is at least a threshold amount greater than a sum of sizes of children nodes of the node” as recited in claim 9 or “determining whether the node can be divided comprises determining that the node can be divided if a size of the node is at least a threshold amount greater than a sum of sizes of children nodes of the node” as

recited in claim 11. Yang makes no mention of the concept of determining the sum of sizes of children nodes and comparing the size of node to the threshold amount greater than the sum of sizes of children nodes. Ma fails to remedy these deficiencies.

Therefore, Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of claims 5, 7-9 and 11-13. Accordingly, claims 5, 7-9 and 11-13 are believed to be allowable over Yang and Ma.

Dependent claims 14, 16, 17, 20-30 depend from allowable base claim 1 and hence are allowable by the virtue of their dependence on the allowable base claim. Further, claims 14, 16, 17, 20-30 are allowable because Yang and Ma either alone or in combination do not teach or suggest all the elements of these claims.

As mentioned above in reference to claim 1, Yang merely describes detecting visual cues based on the semantic similarities between HTML documents and fails to disclose specifically identifying separators between various visual blocks based on the document model. Thus, Yang fails to disclose “detecting one or more horizontal separators of the document; and detecting one or more vertical separators of the document” as currently recited in claim 14. Furthermore, Yang does not teach or suggest “determining to split a particular one of the separators into multiple separators if one or more of the plurality of visual blocks is contained in the particular separator” as currently cited in claim 16.

Similarly, Yang fails to teach “determining, if one or more of the plurality of visual blocks overlap a particular one of the separators, to modify one or more parameters of the particular separator so that the one or more of the plurality of visual blocks no longer overlap the particular separator” as currently recited in claim 17 or “determining to remove a particular one of the separators from a separator list if one or more of the plurality of visual blocks cover the particular separator” as recited in claim 20. Ma fails to remedy these deficiencies.

Claims 21-25 recite subject matter related to the weight of the separators. As mentioned above with reference to claim 1, Yang is totally silent on the aspect of assigning weight to the separators. Hence, Yang does not disclose the subject matter of claims 21-25. Ma fails to remedy these deficiencies.

Further, Yang does not disclose the subject matter of claims 26-30. For example, Yang does not disclose “checking whether each of the plurality of visual blocks satisfies a degree of coherence threshold” as recited in claim 26 or “generating one or more virtual blocks based on the plurality of visual blocks” as recited in claim 27. Similarly, Yang also does not show or disclose “generating the one or more virtual blocks by combining two visual blocks of the plurality of visual blocks” as recited in claim 28. Moreover, Yang does not disclose “determining a degree of coherence value for each of the one or more virtual blocks” and “wherein determining the degree of coherence value for a virtual block comprises determining the degree of coherence value for the virtual block based at least in part on a weight of a separator between two visual blocks used to

generate the virtual block” as recited in claims 29 and 30, respectively. Ma fails to remedy these deficiencies.

Therefore, Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of claims 14, 16, 17 and 20-30. Accordingly, claims 14, 16, 17 and 20-30 are believed to be allowable.

Independent claim 31, as presently amended, recites:

One or more computer readable media having stored thereon a plurality of instructions that, when executed by one or more processors of a device, causes the one or more processors to, at least:

identify visual blocks in a document based on, at least, a document model wherein the said document is described by a tree structure having a plurality of nodes;

detect, distinct from the visual blocks, visual separators of the document based on, at least, one or more characteristics of at least one of the visual blocks;~~and~~

assign to each of the one or more separators, a weight based on characteristics of visual blocks on either side of the separator; and

construct, based at least in part on the visual blocks and the visual separators, a content structure for the document that identifies regions of the document that represent semantic content of the document.

As set forth above with respect to independent claim 1 and its dependent claims, Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest such features as a “document described by a tree structure having a plurality of nodes” or “assigning, to each of the one or more separators, a weight based on

characteristics of visual blocks on either side of the separator.” Accordingly, independent claim 31 is believed to be allowable over Yang and Ma.

Independent claim 68, as presently amended recites

A system, implemented at least in part by a computing device, comprising:

- a visual block extractor, embodied at least in part in a computer readable medium, to extract visual blocks from a document based on, at least, a document model wherein the said document is described by a tree structure having a plurality of nodes;

- a visual separator detector, embodied at least in part in a computer readable medium, coupled to receive the extracted visual blocks and configured to, at least, detect, based on, at least, one or more characteristics of the extracted visual blocks, one or more visual separators of the document and assign to each of the one or more separators, a weight based on characteristics of visual blocks on either side of the separator; and

- a content structure constructor, embodied at least in part in a computer readable medium, coupled to receive the extracted visual blocks and the detected visual separators, and configured to, at least, construct a content structure for the document based on, at least:

- one or more of the extracted visual blocks; and

- one or more of the visual separators.

Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of independent claim 68. For example, Yang does not teach or suggest “a document model wherein the said document is described by a **tree structure having a plurality of nodes**” or “a **visual separator detector**, embodied at least in part in a computer readable medium, coupled to receive the extracted visual blocks and configured to, at least, detect, based on, at least, one or more characteristics of the extracted visual blocks, one or more visual separators of the document and **assign**

to each of the one or more separators, a weight based on characteristics of visual blocks on either side of the separator.” Ma fails to remedy these deficiencies. Accordingly, independent claim 68 is allowable over Yang and Ma.

Independent claim 74, as presently amended recites:

A system, implemented at least in part by a computing device, comprising:

means, embodied at least in part in a computer readable medium, for identifying a plurality of visual blocks in a document based on, at least, a document model of the document wherein the said document is described by a tree structure having a plurality of nodes;

means, embodied at least in part in a computer readable medium, for detecting, distinct from the plurality of visual blocks, one or more separators of the document based on, at least, one or more characteristics of at least one of the plurality of visual blocks, and assigning to each of the one or more separators, a weight based on characteristics of visual blocks on either side of the separator; and

means, embodied at least in part in a computer readable medium, for constructing, based at least in part on the plurality of visual blocks and the one or more separators, a content structure for the document, wherein the content structure identifies the different visual blocks as different portions of semantic content of the document.

For reasons generally similar to those set forth above with respect to independent claim 1 and its dependent claims, Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of independent claim 74. For example, Yang does not teach or suggest “a document model of the document wherein the said document is described by a tree structure having a plurality of nodes” or

“detecting, distinct from the plurality of visual blocks, one or more separators of the document based on, at least, one or more characteristics of at least one of the plurality of visual blocks, and assigning to each of the one or more separators, **a weight based on characteristics of visual blocks on either side of the separator.**” Ma fails to remedy these deficiencies. Accordingly, independent claim 74 is allowable over Yang and Ma.

Dependent claims 32, 70 and 75 depend from independent base claims 30, 68 and 74 respectively and hence are allowable by the virtue of their dependence on the allowable base claims as well as for the features that they recite.

Dependent claims 33 and 71 depend from independent base claims 30 and 68 respectively and hence are allowable by the virtue of their dependence on the allowable base claims as well as for the features that they recite.

Dependent claims 35 and 73 depend from independent base claims 30 and 68 respectively and hence are allowable by the virtue of their dependence on the allowable base claims as well as for the features that they recite.

Dependent claim 69 depends from independent base claim 68 and hence is allowable by the virtue of its dependence on the allowable base claim as well as for the features that it recites. For example, neither Yang nor Ma teaches or suggests “a document retrieval module to retrieve documents from a plurality of documents based at least in part on the content structure constructed for one or more of the plurality of documents.” Thus, dependent claim 69 is allowable over the cited references.

Dependent claims 76-78 depend from independent base claim 1 and hence are allowable by virtue of their dependence on the allowable base claim as well as for the features that they recite. The Office in Office Action, page 9-10 states that Ma teaches the use of document models in the visual analysis of documents (Ma, Para [0009]). However, as discussed above in reference to claim 1, Ma is directed to a “document identification system for identifying a segmented document.” The document model as described by Ma is specifically directed towards layout graphs in a segmented document (Ma, Para [0021]). However, the “document model” and method identification of Ma does not include “visual blocks specified with respect to the document model” as recited in claim 76. In fact, Yang and Ma, whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest all of the features of any of claims 76-78. Accordingly, claims 76-78 are allowable over Yang and Ma.

Dependent claims 79-80 depend from independent base claim 1 and hence are allowable by the virtue of their dependence on the allowable base claim. Furthermore, claims 79-80 are allowable because Yang and Ma either alone or in combination do not teach or suggest “initializing a specification of an initial separator to include a display area that would be occupied by the entire document if it were displayed” or “initializing a specification of an initial separator to include a display area that would contain each of the plurality of visual blocks if they were displayed” as recited in claims 79 and 80 respectively.

The Office, on page 10 of the Office Action, cites Figure 3a and 3b of Yang in support of rejecting claims 79-80. However, Fig. 3a and 3b are merely examples of the adaptation results showing guided reduction of contents using the detected content structures. These figures do not show “detecting one or more separators of the document comprises initializing a specification of an initial separator to include a display area that would be occupied by the entire document if it were displayed” or “detecting one or more separators of the document comprises initializing a specification of an initial separator to include a display area that would contain each of the plurality of visual blocks if they were displayed.”

Since, Yang and Ma whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of claims 79-80, the claims are believed to be allowable.

CONCLUSION

For at least the foregoing reasons, claims 1, 3-5, 7-9, 11-14, 16, 17, 20-33, 35, 68-71 and 73-80 are in condition for allowance. Applicant respectfully requests reconsideration and withdrawal of the rejections and an early notice of allowance.

If any issue remains unresolved that would prevent allowance of this case, **Applicant requests that the Examiner contact the undersigned attorney to resolve the issue.**

Respectfully submitted,

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By: / Christopher W. Lattin/

Christopher W. Lattin
Lee & Hayes, pllc
Reg. No. 56,064
(509) 324-9256 ext. 263